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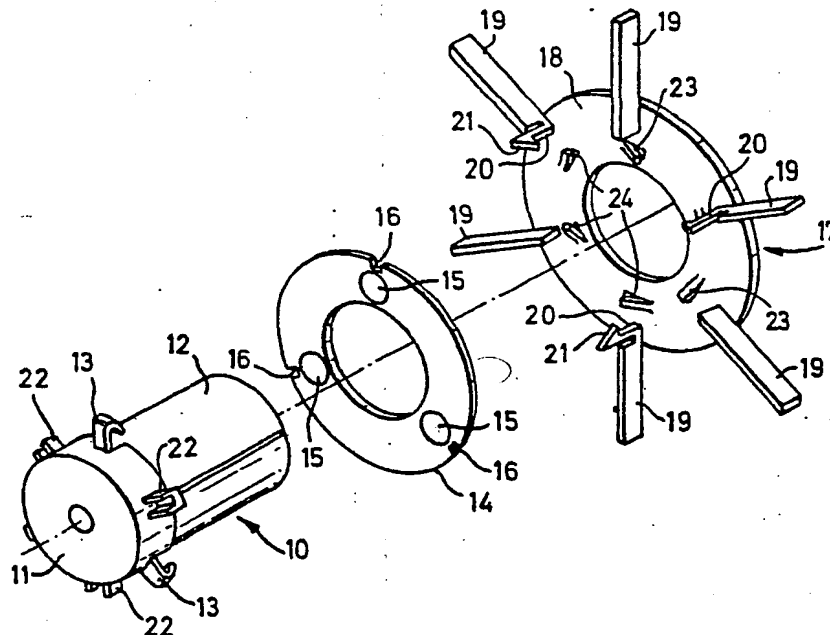
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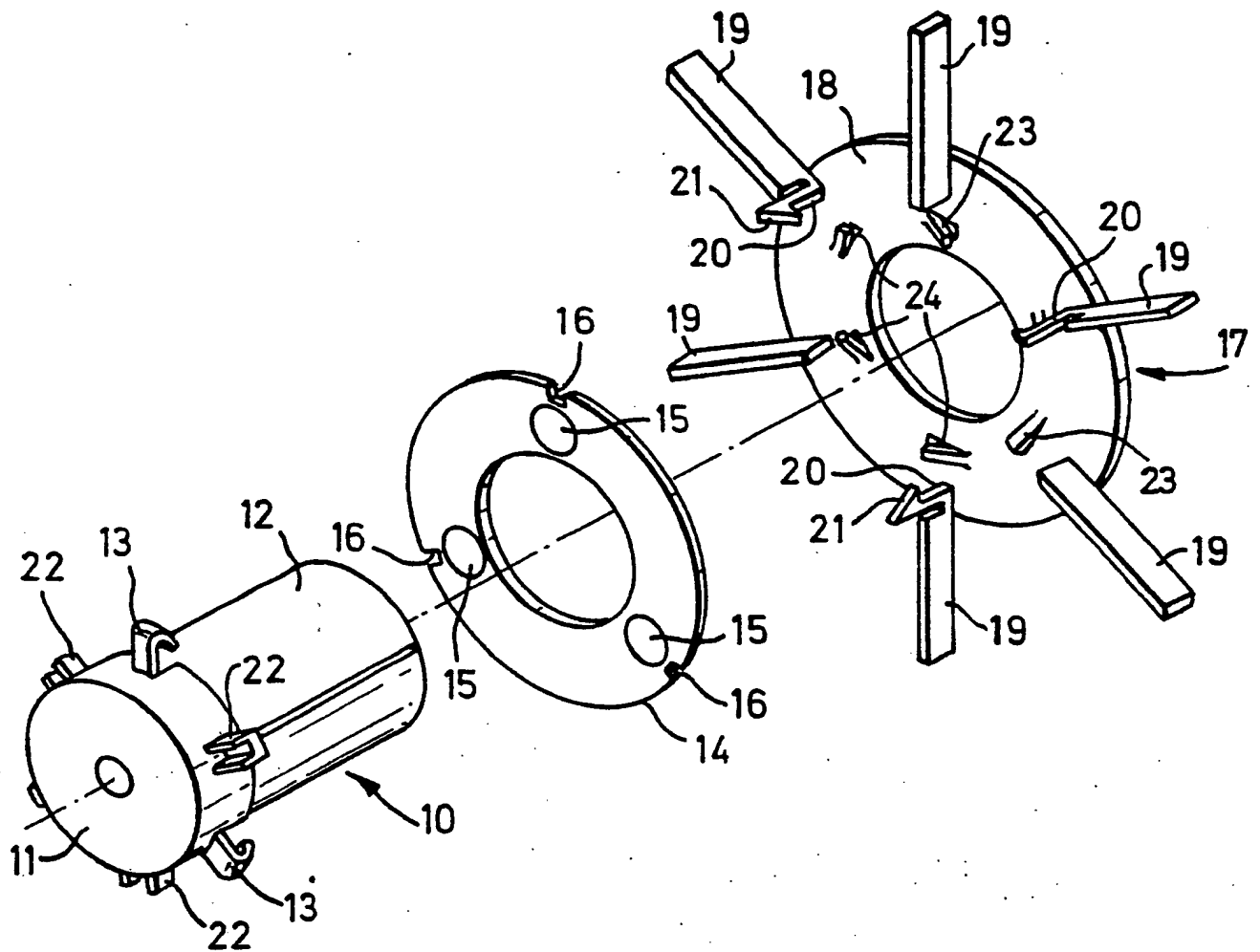
(56) Documents cited  
**GB A 2189353 GB A 2183933**

(58) Field of search  
**H2A**  
**Selected US specifications from IPC sub-class  
H02K**

(54) **Securing a varistor to the commutator of an electric motor**

(57) A varistor ring (14) is clamped in intimate mechanical and electrical contact with terminals (13) of a commutator (10) by using a clip-on plastics clamping member (17), thus avoiding the application of heat which could damage the varistor ring. Claws 12 engage projections 22, the varistor being resiliently supported against terminals by tongs 23. Fan blades 19 may be provided and draw air over the varistor via holes 24.





An armature for an electric motor

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This invention relates to an armature for an electric motor.

5 It is known in the field of electric motors to solder a varistor ring to commutator tangs so that varistor elements are connected between pairs of adjacent commutator segments. The varistor elements serve to discharge inductive energy from the winding coils and thus reduce electrical noise.

10 Varistors are made by a sintering process and are by their very nature extremely brittle. They are easily damaged with respect to their function if excessive heat is applied during the soldering process.

15 In order to mitigate this drawback the present invention provides an armature for an electric motor, provided with a commutator comprising a plurality of commutator segments each having an integral terminal connected to a portion of the armature winding, a varistor ring, and means clamping the varistor ring in contact with the  
20 terminals of the commutator.

Preferably, the clamping means comprises a plastics clamping member.

Advantageously, the clamping member is a clip-on clamping member. In that case, the clamping member may comprise a part which bears against the varistor ring and a plurality of legs which extend in a direction  
5 parallel or substantially parallel to the axis of the armature and which engage with the armature on that side of the varistor ring distal from the commutator segments.

Conveniently, the clamping means includes a plurality of integral fan blades, which preferably extend radially  
10 outwards from the clamping means.

The invention also provides an electric motor comprising an armature as set forth above.

The invention will now be more particularly described by way of example only with reference to the accompanying  
15 drawing which is an exploded perspective view of part of one embodiment of an armature for an electric motor, according to the present invention.

Referring to the drawing, a barrel-type commutator 10 shown therein comprises a generally cylindrical  
20 commutator base 11 which is mounted fast on an armature shaft (not shown) and a plurality of commutator segments 12 (three are shown) each provided with an integral terminal in the form of a tang 13. Portions of an armature winding (not shown) are connected to the tangs

13 by connections which involve the application of heat, e.g. by hot forging or soldering.

A varistor ring 14 has three silver pads 15 equi-angularly spaced apart around the circumference of the ring 14 for contact with the commutator tangs 13.  
5 The varistor ring 14 also has three notches 16 aligned with the silver pads 15.

A clip-on clamping member 17 comprises a flat annular part 18, a plurality of radially outwardly extending fan blades 19 (six are shown), and three resilient legs 20.  
10 The clamping member 17 is formed as a unitary plastics moulding and the fan blades 19 extend well beyond the outer edge of the annular part 18.

The legs 20 extend in a direction parallel to the axis of the armature and are radially aligned with alternate fan blades 19. Radially inwardly extending feet 21 on the distal ends of legs 20 engage with U-section lugs 22 extending radially outwardly from the commutator base 11 between the commutator tangs 13 to clip the clamping member 17 onto the commutator and hence to clamp the varistor ring 14 between the annular part 18 and the tangs 13.  
15  
20

A plurality of spring fingers 23 project at an acute angle from the plane of the annular part 18 to bear

against the varistor ring 14 and urge the latter into intimate contact with the tangs 13. The fingers 23 also serve to absorb shocks which may otherwise cause the varistor ring 14 to break.

5       Apertures 24 in the annular part 18 behind the fingers 23 allow air to be drawn over the varistor ring 14 by the fan blades 19.

10       The notches 16 in the varistor ring 14 receive the inner ends of three of the fan blades 19 when the varistor ring 14 is clamped to the commutator tangs 13 in order to locate the varistor ring 14 angularly with respect to the commutator 10.

15       The above embodiment is given by way of example only and various modifications will be apparent to persons skilled in the art without departing from the scope of the invention. For example the fan blades 19 could be omitted. Moreover, the varistor could be clamped in similar manner to commutator terminals of a type which are provided with a slot straddling and gripping a  
20       respective portion of an armature winding and which are located in housings of a terminal support, such as is more particularly described, for example, in our British Patent No. GB 2128818B.

CLAIMS

1. An armature for an electric motor, provided with a commutator comprising a plurality of commutator segments each having an integral terminal connected to a portion  
5 of the armature winding, a varistor ring, and means clamping the varistor ring in contact with the terminals of the commutator.
2. An armature as claimed in claim 1, wherein said clamping means comprises a plastics clamping member.
- 10 3. An armature as claimed in claim 1 or claim 2, wherein the clamping member is a clip-on clamping member.
4. An armature as claimed in claim 3, wherein the clamping member comprises a part which bears against the varistor ring and a plurality of legs which extend in a  
15 direction parallel or substantially parallel to the axis of the armature and which engage with the armature on that side of the varistor ring distal from the commutator segments.
5. An armature as claimed in claim 4, wherein said  
20 part comprises a plurality of shock absorbing spring fingers which urge the varistor ring into contact with the terminals of the commutator.

6. An armature as claimed in anyone of the preceding claims, wherein the clamping means includes a plurality of integral fan blades.

5 7. An armature as claimed in claim 6, wherein the fan blades extend radially outwards from the clamping means.

8. An armature as claimed in anyone of the preceding claims, wherein the commutator terminals are in the form of tangs connected to respective portions of the armature winding by connections which involved the application of heat.

10

9. An armature as claimed in anyone of the preceding claims, wherein each commutator terminal is provided with a slot which straddles and grips a respective portion of the armature winding and wherein the armature includes a terminal support having a plurality of housings in which the terminals are located.

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10. An armature for an electric motor, substantially as hereinbefore described with reference to the accompanying drawings.

11. An electric motor comprising an armature as claimed in anyone of the preceding claims.

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EPODOC / EPO

PN - JP8214503 A 19960820  
 PD - 1996-08-20  
 PR - JP19950037616 19950201  
 OPD - 1995-02-01  
 TI - ROTATOR OF MOTOR  
 IN - KOBAYASHI KAZUTAKA  
 PA - SANKYO SEIKI SEISAKUSHO KK  
 IC - H02K9/28 ; H01R39/48 ; H02K13/00

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TI - Rotor of motor - generates air current using blade unit object, such that main part rotates and brush contacts commutator  
 PR - JP19950037616 19950201  
 PN - JP8214503 A 19960820 DW199643 H02K9/28 004pp  
 PA - (SAOB) SANKYO SEIKI MFG CO LTD  
 IC - H01R39/48 ; H02K9/28 ; H02K13/00  
 AB - J08214503 The rotor has an iron core around which a coil is wound. A shaft is connected to the center of the iron core and is provided with a commutating unit. A brush (9) contact this unit, which consists of a commutator (8) and a commutator holder (11). The commutator is fixed to the internal circumference surface of a ring shaped blade unit base (2).  
 - A blade unit object (1) has a blade unit (3) connected to the periphery of the blade unit base. An air current is generated by the blade unit object such that the main part rotates and the brush contacts the commutator.  
 - ADVANTAGE - Reduces poor contacting possibilities of brush with commutator. Increases lifespan of commutator and brush. Improves stability of operation and reliability of contact.  
 - (Dwg.1/5)  
 OPD - 1995-02-01  
 AN - 1996-431432 [43]

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TI - ROTATOR OF MOTOR

AB - PURPOSE: To provide a commutator device which does not permit a substance stacking on the sliding surface between a commutator unit and a brush to grow up with a blade element positioned at the commutator unit.

- CONSTITUTION: A brush<sup>9</sup> is brought into sliding contact with a commutator unit consisting of a commutator holder<sup>11</sup> and a commutator<sup>8</sup>. The inner periphery of a circular blade base<sup>2</sup> is secured onto the commutator<sup>8</sup> so that one end of the commutator unit near the sliding position may be surrounded by the commutator<sup>8</sup>, and a blade element<sup>1</sup> provided with blades<sup>3</sup> is formed at the outer periphery of the blade base<sup>2</sup>. This mechanism permits a substance generated with the rotation of the arrow-indicated commutator unit to be scattered by air pressure generated by the blades from a sliding contact part between the brush<sup>9</sup> and the commutator<sup>8</sup> while the brush<sup>9</sup> is being brought into sliding contact with the commutator<sup>8</sup>.

I - H02K9/28 ;H01R39/48 ;H02K13/00